



# Phosmet Technical Briefing



February 10, 2000



# Overview



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OPP

## Overview of Day's Activities

- ❑ Legal framework and regulatory history
- ❑ Provide usage profiles
- ❑ Present risk assessments
- ❑ Questions and comments

## Goals of Meeting

- ❑ Provide an understanding of EPA's risk assessments
- ❑ Answer your questions
- ❑ Identify risks of concern
- ❑ Begin risk mitigation dialog

## Legal Context

FQPA amendments to FIFRA required:

- ❑ Reassessment of all existing tolerances
- ❑ Aggregate assessments
- ❑ Safety factor for children
- ❑ Cumulative assessments

## EPA Implementation of FQPA

- ❑ Formation of Tolerance Reassessment Advisory Committee (TRAC)
- ❑ Development of science policies
- ❑ Development of pilot process for public participation
- ❑ Focus on OPs

## TRAC Pilot OP Review Process

- Phase 1 (30 days)
  - Registrant "error only" review
- Phase 2 (up to 30 days)
  - EPA considers registrants' comments
- Phase 3 (60 days)
  - Public comment on preliminary risk assessment

## TRAC Pilot OP Review Process

- Phase 4 (90 days)
  - EPA revises risk assessments, holds public meetings/technical briefings
- **Phase 5 (60 days)**
  - **EPA solicits risk management ideas**
- Phase 6 (up to 60 days)
  - EPA develops risk management strategies



## Regulatory History and Comments



Diane Isbell, Chemical Review Manager  
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## Phase 3 Public Comments

- ❑ Comments received from registrants, growers, and public
- ❑ Registrants' concerns
  - Non-supported uses in risk assessment
  - Default transfer coefficients used in risk assessment
  - Post-application assessment
  - Outstanding data

## Phase 3 Public Comments

- ❑ Grower comments
  - Importance for IPM programs
  - No equivalent alternatives
  - Data
- ❑ Washington State Department of Agriculture commented on toxicity to bees

## Phase 3 Public Comments

- Natural Resources Defense Council (NRDC) - comments for all OPs
- ❑ Common mechanisms
- ❑ FQPA 10X Safety Factor
- ❑ Highly exposed populations
- ❑ Data requirements/assumptions
- ❑ Transitioning to safer alternatives

## Phase 4 Revise Risk Assessments

- ❑ Changes to the risk assessment
  - Refined dietary assessment
  - Dermal and inhalation toxicity endpoint selection
  - Revised worker assessment

## Regulatory History

- ❑ First registered in 1966 by Stauffer Chemical Company
- ❑ Registrants are Gowan Company and Schering-Plough Animal Health
- ❑ Registration Standard issued in 1986



## Use Profile



Bill Gross, Entomologist  
Biological & Economic Analysis Division  
OPP



## Use Profile

- ❑ Restricted use organophosphate
- ❑ Mode of action
  - Acetylcholine esterase inhibition
- ❑ Registered uses
  - Field crops, pome & stone fruit, vegetables, forestry, ornamentals, livestock, and dogs
- ❑ Average domestic use 1988-1998
  - About one million lbs. on 400,000 acres per year



## Use Profile

### □ Formulations

- Emulsifiable concentrate
- Emulsifiable liquid
- Wettable powder
- Water soluble bags
- Dust

## Use Profile

### □ Typical Use Rates

- 0.4 - 3.1 lbs ai/acre
- 1 to 2 applications per season for most crops

### □ Maximum Use Rates

- 0.7 to 6 lbs ai/acre
- 1 to 5 applications per season (where specified)

## Use Profile

### □ Application Methods

- Aerial (fixed-winged and helicopter)
- Airblast sprayer
- Hydraulic groundboom sprayer
- Power duster (sweet potatoes)
- Chemigation
- Low pressure sprayers (handwand and backpack)
- High pressure sprayer (livestock & ornamentals)
- Back rubber (livestock)
- Dip/dust (dogs)

## Use Profile

### □ Major use sites (% total lbs ai)

- Pome fruit (47%)
- Nut crops (18%)
- Stone fruit (17%)

## Use Profile

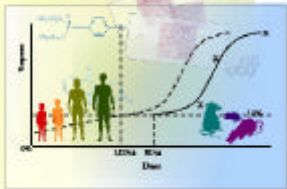
- ❑ Major use sites (% crop treated)
  - On average, over 20% crop treated for apples, apricots, blueberries, and peaches
  - In high use seasons, over 25% crop treated apples, apricots, blueberries, cherries, kiwi, nectarines, peaches, peas, potatoes, and walnuts
  - Most stored sweet potatoes

## Use Profile

### Sources of Data

- ❑ USDA/NASS
- ❑ California Department of Pesticide Regulation
- ❑ National Center for Food and Agricultural Policy
- ❑ Registrants
- ❑ Proprietary EPA databases
- ❑ Growers

# Human Health Risk Assessment



[www.epa.gov/pesticides/op/Phosmet.htm](http://www.epa.gov/pesticides/op/Phosmet.htm)

## Dietary Risk Assessments



Christina Swartz, Risk Assessor  
Health Effects Division  
OPP

## Risk Assessment Components

- Dietary
  - Food
  - Drinking water
- Occupational
  - Handlers
  - Post-application workers
- Residential
  - Toddlers
  - Home gardens
- Aggregate (food, drinking water, residential)

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## Dietary Risk Equation

Risk = Hazard x Exposure, where

$$\text{Exposure} = \text{Consumption} \times \text{Residue}$$

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## Hazard Identification Process

- Review/evaluation of all toxicology studies
- Selection of studies appropriate for route and duration
- Simulate actual exposure conditions

## Hazard Identification Process

- Consider all adverse effects seen
- Selection of critical endpoint of concern
- Selection of the lowest NOAEL for the critical effect
- Dose/endpoint selected would be protective of all adverse effects

## Effect Levels

- **Lowest Observed Adverse Effect Level = LOAEL**
  - Lowest dose at which an “adverse” health effect is seen. Has units of mg per kg body weight per day.
- **No Observed Adverse Effect Level = NOAEL**
  - Highest dose at which no “adverse” health effect is seen. This dose is less than the LOAEL. Has units of mg per kg body weight per day.

## Acute Hazard (Toxicity)

- **Study:** Rat acute neurotoxicity study showed plasma, red blood cell (RBC), and brain cholinesterase inhibition
- **Endpoint:** Plasma, RBC and brain cholinesterase inhibition
  - **LOAEL:** 22.5 mg/kg/day
  - **NOAEL:** 4.5 mg/kg/day

*Endpoint from this study most accurately reflects toxicity which could result from one-day dietary exposure to Phosmet*

## Chronic Hazard (Toxicity)

- ❑ **Study:** Rat chronic toxicity study showed RBC and serum cholinesterase inhibition
- ❑ **Endpoint:** RBC cholinesterase Inhibition
  - **LOAEL:** 1.8 mg/kg/day
  - **NOAEL:** 1.1 mg/kg/day

*Endpoint from these studies most accurately reflect toxicity which could result from long-term dietary exposure to Phosmet.*

## Carcinogenicity

- ❑ Previous classification
  - “Possible” human carcinogen
  - Quantitative cancer assessment not recommended
- ❑ Current classification (1996 Cancer Guidelines)
  - “Suggestive” evidence for carcinogenicity
  - Quantitative cancer assessment not recommended



## Analysis of Special Sensitivity of Infants and Children

- No developmental effects in fetuses
- No toxicity to offspring below maternally toxic doses
- No increased sensitivity in pups relative to adults
- No abnormalities in developing fetal nervous system
- No histopathology of the nervous system
- Complete toxicity database
- Good exposure data - unlikely that exposures are underestimated

## Uncertainty Factors

- |        |  |
|--------|--|
| □ 10X  | Interspecies Variability                       |
| □ 10X  | Intraspecies Sensitivity                       |
| □ 1X   | FQPA Safety Factor                             |
| □ 100X | Total UF for all Human Health Risk Assessments |

## Reference and Population Adjusted Doses

$$RfD = \frac{NOAEL}{UF}$$

$$PAD = \frac{RfD}{FQPA \text{ Safety Factor}}$$

For Phosmet:

- FQPA Safety Factor = 1x
- RfD = PAD

## Population Adjusted Doses for Phosmet

- Acute PAD = 0.045 mg/kg/day
- Chronic PAD = 0.011 mg/kg/day

## Dietary Risk Assessments

- ❑ Highly refined analyses were conducted
- ❑ Acute dietary (1-day exposure)
  - Estimated maximum % crop treated
  - Monitoring and field trial data; processing/cooking studies
- ❑ Chronic dietary (longer-term exposure)
  - Weighted average % crop treated
- ❑ Monitoring data were used for all crops except nuts and cottonseed oil

## Dietary Risk Estimated as %PAD

Population	% aPAD (at 99.9%)	% cPAD
U.S. Population	3	<1
Infants <1yr.	6	<1
Children 1-6	8	<1
Children 7-12	4	<1

## Drinking Water Risk Assessment

- ❑ The available monitoring data could not be used
- ❑ The Agency generates surface and ground water estimated environmental concentrations based on:
  - Environmental fate data
  - Modeling
- ❑ The Agency assesses risks based on:
  - Toxicity of phosmet
  - Estimated environmental concentrations

## Drinking Water Risk Assessment

- ❑ Determined exposure to phosmet in food first, then considered any remaining allowable exposure in drinking water
- ❑ Example:
  - For children 1 - 6, 8% of the acute PAD used by exposure through food
  - 92% of the acute PAD remaining for exposure through drinking water

## Drinking Water Risk Assessment

- Drinking water exposure based on model estimates was less than the amount of the acute and chronic PADs allocated for ground & surface water
  - Conclude: acute and chronic exposures to phosmet in drinking water are not of concern

## Occupational and Residential Risk Assessments



Jeffrey Dawson, Chemist  
Health Effects Division  
OPP

## Occupational Risk Assessment

- ❑ Handlers (e.g., mix/load, apply)
  - Agricultural uses
  - Direct animal treatments
  - Ornamental/forestry uses
- ❑ Post-application
  - Harvesting crops
  - Crop maintenance/scouting

## Residential Risk Assessment

- ❑ Handlers (e.g., mix/load, apply)
  - Home gardens
  - Pet treatments
  - Ornamentals
- ❑ Post-application
  - Adults & children during home garden harvest/maintenance
  - Toddler contact with treated dogs

## Human Health Risk Equation

$$\text{Risk} \sim \text{Hazard} \times \text{Exposure}$$

## Phosmet Toxicity Profile

- ❑ Effects: cholinesterase inhibition in plasma, red blood cells, serum and the brain
- ❑ Duration of exposure is a key factor
  - 0 to 7 days
  - 8 to 30 days
  - > 30 days
- ❑ No evidence of developmental toxicity

## Toxicity Endpoints: 0-7 Day Duration

Route	Study	NOAEL and Effect
Dermal	21 day rat dermal toxicity	15 mg/kg/day Plasma & brain ChEI
Inhalation	Oral rat acute neurotoxicity	4.5 mg/kg/day Plasma, RBC & brain ChEI

UF = 100 for all assessments

## Toxicity Endpoints: 8 to 30 Day Duration

Route	Study	NOAEL and Effect
Dermal	21 day rat dermal toxicity	15 mg/kg/day Plasma & brain ChEI
Inhalation	Oral rat subchronic neurotoxicity	1.5 mg/kg/day Plasma & brain ChEI

UF = 100 for all assessments



## Toxicity Endpoints: > 30 Day Duration

Route	Study	Endpoint
Dermal	Chronic rat	1.1 mg/kg/day RBC & serum ChEI
Dermal Absorption	Rat dermal absorption	10 %
Inhalation	Chronic rat	1.1 mg/kg/day RBC & serum ChEI

UF = 100 for all assessments

## Key Use Parameters

- ❑ Four formulation types (WP, EC, Dust, SC)
- ❑ Occupational uses include:
  - Agriculture (e.g., tree fruit/nuts, grapes)
  - Direct animal (e.g., cattle, dogs)
  - Ornamentals (e.g., trees, shrubs, fire ants)
- ❑ Residential uses include:
  - Home gardens (e.g., tree fruit)
  - Direct animal (e.g., dogs)
  - Ornamentals (e.g., trees, shrubs, fire ants)

## Key Use Parameters

- Application methods include:
  - Aerial
  - Ground equipment (e.g., groundboom, airblast)
  - Handheld equipment (e.g., backpack sprayer)
- Varied application rates (e.g., 0.7 to 6 lb ai/A in agriculture)
- Most crops treated <2 times per year

## Current Phosmet Labels

- For handlers:
  - Long pants, long sleeved shirt, gloves, dust mist respirator
  - In some cases, aprons and headgear are also required
- For post-application workers:
  - Restricted Entry Intervals = 24 hours

# Handler Assessments

We calculate handler exposures by considering:

- ❑ Tasks associated with job
- ❑ Formulation and application equipment (e.g., WP formulation, airblast)
- ❑ Levels of personal protection
- ❑ Amount applied per day
- ❑ Toxicity of chemical

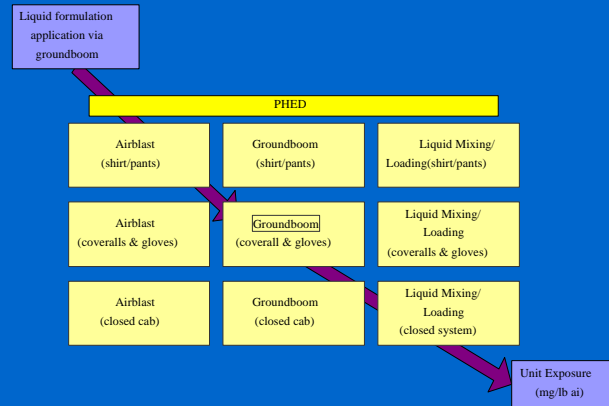


# Handler Risk Calculation

$$\text{Dose} = \frac{(\text{unit exposure}) \times (\text{appl. rate}) \times (\text{acres/day})}{\text{Body Weight (70 kg)}}$$

$$\text{MOE} = \frac{\text{NOAEL (mg/kg/day)}}{\text{Dose (mg/kg/day)}}$$

# Handler Assessments Using PHED



## Occupational Handler Exposures

- ❑ Mixing/loading of liquids & wettable powders
- ❑ Application of liquid sprays/solutions
  - Aerial
  - Groundboom
  - Airblast
- ❑ Mixing/loading/applying with hand equipment
- ❑ Application of dusts
  - Veterinary uses
  - Sweet potato
- ❑ Flagging for aerial applications

## Example Handler Scenarios

- ❑ Uses in agriculture:
  - 2a: Mixing/loading wettable powders for aerial application
  - 2b: Mixing/loading wettable powders for groundboom application
  - 3: Applying sprays with an airblast sprayer
  - 4: Applying sprays with a groundboom sprayer

Reflects presentation in risk assessment and overview

## Handler Results: Agricultural Uses

- ❑ Risks are not of concern for all but one scenario (assuming engineering controls for high use exposures)
- ❑ There is a risk concern for aerial mixer/loaders, MOEs from <10 to ~90
- ❑ Current label is generally adequate for low use exposures
- ❑ Key factors are use rate, area treated, personal protection, and equipment used

## Handler Results: Direct Animal Uses

- ❑ Risks are not a concern for all but one scenario
- ❑ Current label generally is adequate (some require additional PPE)
- ❑ There is a risk concern for high pressure handwand application > 30 days, MOEs from <10 to ~90
- ❑ Key factors are use rate, amount used, duration, personal protection and equipment used
- ❑ Data not available for some scenarios

## Handler Results: Ornamental Uses

- ❑ Risks are not a concern for all but one scenario
- ❑ There are risk concerns for aerial forestry WP mixer/loaders, MOEs from <10 to ~30
- ❑ Key factors are use rate, area treated, personal protection and equipment used

## Residential Handler Exposures

- ❑ Dusting and dipping dogs
- ❑ Mixing/loading/applying with hand equipment to home gardens, fruit trees, and ornamentals
- ❑ Fire ant control

## Residential Handler Results

- There are risk concerns for low pressure handwand applications of wettable powders on ornamentals (MOE = 80) and fruit trees (MOE = 40)
- Key factors are use rate, area treated, and equipment used

## Interpreting Handler Risk Assessments

- Lack of exposure data
- Extrapolation (e.g., backrubber)
- Large acreages treated (aerial)
- Typical and maximum application rates
- Different frequencies and durations of exposure (data are lacking to further define)



# Components of Post-Application Assessment

- ❑ Define residues (e.g., DFRs)
- ❑ Occupational (REIs)
- ❑ Residential
  - Adult
  - Children (10-12 years)
  - Toddlers



## Post-Application Assessments

We calculate exposures by considering:

- ❑ Exposed populations (adults & children)
  - Activities that contribute to exposure (e.g. harvest)
  - Duration of exposure (e.g. 8 hour work day)
- ❑ Application parameters
  - Rate
  - Frequency
  - Persistence on treated leaves
  - Application method
- ❑ Toxicity of chemical
- ❑ Exposure data

## Post-application Dermal Risk Calculation

- ❑ Dislodgeable Foliar Residues (DFR):
  - amount of residue that rubs off during contact with skin
- ❑ Transfer Coefficient (TC):
  - indicator of amount of contact during various field activities

$$\text{Dose} = \frac{\text{DFR } (\mu\text{g}/\text{cm}^2) \times \text{TC } (\text{cm}^2/\text{hour}) \times \text{hours}}{\text{body weight (kg)}}$$

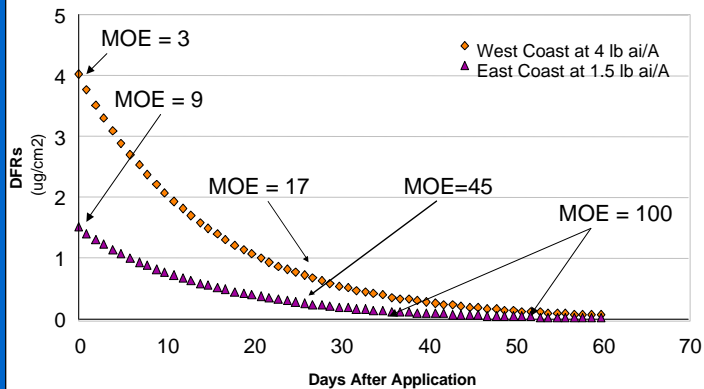
## Occupational Post-application Exposures

- 1) Harvesting fruit & nuts
- 2) Harvesting & maintaining grapes
- 3) Harvesting & maintaining blueberries
- 4) Harvesting field crops (e.g., peas)
- 5) Low exposure activities (e.g., scouting)

## Apple REI Inputs

- ❑ Application rates 4 and 1.5 lbs ai/A
- ❑ Pear data used for apples
- ❑ Transfer coefficient: 10,000 cm<sup>2</sup>/hr
- ❑ Time worked: 8 hours/day
- ❑ Standard human factors (e.g., 70 kg weight)
- ❑ Standard work clothing
- ❑ Dermal toxicity endpoint

## Apple Harvester Risks



## Occupational Post-Application: Risk Summary

Scenario & Crop	App. Rate (lb ai/A)	Activity	Days until MOE = 50/100
1: Nuts	6	Harvest	48/58
1: Pears	5	Harvest	45/56
1: Apples (WC)	4	Harvest	42/52
1: Apples (EC)	1.5	Harvest	27/37

## Occupational Post-Application: Risk Summary

Scenario & Crop	App. Rate (lb ai/A)	Activity	Days Until MOE = 50/100
2: Grapes	1	Harvest	34/44
3: Blueberries	1	Harvest	1425
4: Peas	1	Harvest	8/18
5: Various	1	Various low exposure	0/4

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## Interpreting Occupational Risk Assessments

- ❑ Bridged DFR data using different application rates
- ❑ Agricultural Reentry Task Force results will be used as appropriate
- ❑ Standard transfer coefficients developed from available literature
- ❑ Dermal toxicity data used

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## Residential Post-Application Exposures

- ❑ Adults harvesting & maintaining fruit trees
- ❑ Children harvesting & maintaining fruit trees
- ❑ Toddlers after contact with treated dogs

## Basis For Residential Calculations

- ❑ Adult & youth exposures in gardens
  - 40 minute duration
  - Phosmet pear harvesting study used
- ❑ Toddler exposures from treated dogs
  - Agency's *Standard Operating Procedures For Residential Exposure Assessment*
  - Dermal and oral exposures addressed

## Post-application Hand-to-Mouth Risk Calculation (Residential)

$$\square \text{Dose} = (\text{TR} * \text{SA} * \text{SAL} * \text{Freq} * \text{D})/\text{BW}$$

Where:

- TR = Transferable residue
- SA = Surface area of the hands
- SAL = Saliva extraction factor
- Freq = Frequency of events
- D = Duration of exposure
- BW = Body weight

## Residential Post-Application: Risk Summary

For Adults

Scenario & Crop	App. Rate (lb ai/A)	Activity	Days until MOE = 100
Pears	5	Harvest & Maintenance	8 (Day 0 = 62)
Apples (WC)	4		4 (Day 0 = 78)
Apples (EC)	1.5		0

## Residential Post-Application: Risk Summary

For Youth (10-12 Years Old)

Scenario & Crop	App. Rate (lb ai/A)	Activity	Days Until MOE = 100
Pears	5	Harvest & Maintenance	6 (Day 0 = 69)
Apples (WC)	4		3 (Day 0 = 87)
Apples (EC)	1.5		0

## Residential Post-application: Risk Summary

For Toddlers

Exposure	MOE For Small Dogs	MOEs For Large Dogs
Dermal	9	<1
H-to-M	1	<1
Total	1	<1

All on day of application. MOEs never were >100 even 30 days after application.



## Interpreting Residential Risk Assessments

- ❑ Exposure data
  - Fruit tree scenarios based on phosmet pear study
  - Residential SOPs used for toddler calculations
- ❑ Differing application rates
- ❑ Methodologies are evolving

## Phosmet Incidents

### Data Sources

- ❑ OPP Incident Data System (1992-present)
- ❑ Poison Control Centers (PCC, 1993-1996)
- ❑ California DPR (1982-present)
- ❑ National Pesticide Telecommunications Network (1984-1991)
- ❑ Literature studies

## Phosmet Incidents

- ❑ Occupational
  - Agricultural use - fewer incidents relative to other OPs
- ❑ Residential - PCC data, 1993-1996
  - 23% drop in phosmet incidents reported
  - 38% of exposures were to children under 6 years old
  - Phosmet exposures had more severe outcomes than other OPs

## Aggregate Risk Assessment

- ❑ Combines exposures from:
  - Food
  - Drinking water
  - Residential
- ❑ Both adults and children considered

## Aggregate Risk Assessment - Results

### Acute & chronic aggregate

- ❑ Food & water only
- ❑ Food exposure not of concern
- ❑ Drinking water exposure based on model estimates are not of concern

## Residential Aggregate Risk Assessment - Results

### Food, water & residential

- ❑ Aggregate risks were not of concern except for the following residential scenarios:
  - Toddler contact with dogs
  - Harvesting from home gardens treated at higher application rates
  - Homeowner applying wettable powders to ornamentals and fruit trees using low-pressure handwand sprayers

# Ecological Risk Assessment



## Ecological Risk Assessments



Richard Dumas, Team Leader  
Special Review and Reregistration Division  
OPP

## Environmental Fate and Effects Assessment

- ❑ Environmental Fate Assessment
  - Laboratory and field studies
- ❑ Water Resource Assessment
  - Modeling and monitoring
- ❑ Ecotoxicity
  - Acute and chronic studies
  - Birds, mammals, insects, fish, aquatic invertebrates, and plants
- ❑ Ecological Risk Assessment
  - Exposure and toxicity
  - Incidents

## Environmental Fate of Phosmet

- ❑ Mobile, yet relatively non-persistent
- ❑ Primary routes of dissipation
  - Hydrolysis at neutral and alkaline pH's
  - Metabolism in aerobic soil

## Phosmet Degradates

- ❑ Phosmet oxon is a toxicologically significant degradate.
  - It appears to be less mobile than phosmet; additional data are needed to better understand its persistence and mobility.

## Laboratory Fate Parameters

- ❑ Soil half-life of 3 days, CO<sub>2</sub> is major degradate
- ❑ pH 7 and 9 half-lives in water: 9 hours and 5.5 minutes, respectively
- ❑ Does not bind strongly to soil
- ❑ Little potential for bioaccumulation in fish
- ❑ Phosmet oxon appears to be somewhat mobile

## Field Dissipation

- ❑ Field half-lives ranged from 5-19 days when applied to fields in Visali, CA (pears); Leland, MS (cotton); and Orange Cove, CA (Modesto ash).
- ❑ Detections of phosmet were largely in the upper seven inches of soil at all three sites.
- ❑ Phosmet oxon was detected in the 0 to 3 inch soil layer.

## Ground Water Assessment

- ❑ Phosmet or phosmet oxon do not appear to pose a significant threat to ground water resources.
- ❑ Very limited monitoring also indicates little potential for ground water contamination.

## Surface Water Assessment

- ❑ Can contaminate surface water via runoff if rain events occur within the first few weeks post application
- ❑ Persistence in surface water may be limited by its susceptibility to biodegradation and hydrolysis
- ❑ Limited monitoring data indicate its presence in surface water at very low levels

## Implications for Drinking Water

- ❑ Estimated concentrations for drinking water are for phosmet only. Phosmet oxon should not add appreciably to the concentration of parent in ground or surface water in most use areas.
- ❑ The concentration for phosmet in ground water, estimated using SCI-GROW, is 0.4 ppb.
- ❑ The tier II peak surface water concentration is 140 ppb; the overall mean is 1.0 ppb.



## Ecological Risk Assessment: Toxicity and Exposure

### □ Risk Quotients (RQ)

Ratio of exposure concentration to toxicity endpoint

$$\text{Acute RQ} = \frac{\text{Peak Environmental Concentration}}{\text{LC}_{50} \text{ or } \text{EC}_{50}}$$

$$\text{Chronic RQ} = \frac{\text{Peak Environmental Concentration}}{\text{NOAEC}}$$

Ratio is compared to the Agency's Levels of Concern (LOC).

## Summary of Terrestrial Risk

### □ Avian and Mammals

- Potential acute risks appear low
- Chronic risk concerns for all phosmet crop uses when multiple applications are made

## Summary of Risk to Fish

- ❑ Acute risk to freshwater fish (from multiple applications to various crops) is of concern
- ❑ In general, chronic risk to freshwater fish appears to be low
- ❑ Compared to the risk to freshwater fish, acute and chronic toxicity concerns appear to be somewhat less for marine and estuarine species

## Summary of Risk to Aquatic Invertebrates

- ❑ Acute risk to freshwater and marine invertebrates is very high
- ❑ Chronic risk concern to marine invertebrates for all crops that have the potential for marine exposure
- ❑ Chronic concerns for freshwater invertebrates appear to be significant for the following crops: apples, grapes, kiwi, peaches, pears, pecans, and sweet potatoes

## Ecological Incidents

- ❑ Incidents of bee kills have been reported with direct evidence of phosmet exposure
- ❑ Since several registered uses of phosmet include crops that rely on pollination by honey bees, risk to honey bees appears to be very high if phosmet is used in or around these crops

## Risk Summary & Next Steps



Diane Isbell, Chemical Review Manager  
Special Review and Reregistration Division  
OPP

## Risk Summary

### □ Dietary

- No risk concern for food and drinking water

### □ Residential

- Post application risk to toddlers
- Home garden use of concern
  - Application
  - Post-application

### □ Ecological

- Some risks of concern

## Risk Summary

### □ Worker

- Agricultural handler
  - Most risks mitigated with additional PPE and engineering controls
  - Mixing/loading for aerial is of concern
  - No exposure data for power duster
- Post-application
  - Re-entry is of concern

## Comparison of PADs for 3 OP Pesticides

OP	Acute PAD	Chronic PAD
Azinphos Methyl	0.003	0.0015
Methyl Parathion	0.00011	0.00002
Phosmet	0.045	0.011

## Comparison of %PAD for 3 OP Pesticides (Pre-mitigation)

OP	% Acute PAD (Subgroup)	% Chronic PAD (Subgroup)
Azinphos Methyl	130% (children 1-6)	54% (non-nursing infants)
Methyl Parathion	378% (children 1-6)	47% (children 1-6)
Phosmet	8% (children 1-6)	<1% (children 1-6)

## Comparison of Worker MOEs for 3 OP Pesticides

Scenario: Airblast Application to Fruit Trees

OP	Short-term MOE	Intermediate-term MOE
Azinphos Methyl	60-108	39-70
Methyl Parathion	5	5
Phosmet	427	273-372

## Possible Risk Mitigation

- ❑ Clarify labels
- ❑ Worker risk
  - Increase PPE and engineering controls
  - Closed systems for aerial mixer/loader
  - Exposure data for power duster
  - Better characterize reentry activities

# Reentry Activities

				Protective Cultural Practices	No. Days Before Reentry				Other Possible Protective Practices
Crop/App	Growth Stage	Height	Foliage		Typical	Max. Feas.	Freq. of Activity	Duration of Activity	
Broccoli									
1 <sup>st</sup> app	Early, transplant	Low	Min.	Irrigation	4	6	5 hrs	2 consec. days	
				Weeding, hand	5	9	4 hrs	2 consec. days	
2 <sup>nd</sup>									
3 <sup>rd</sup>									
Lettuce									
1 <sup>st</sup>									
2 <sup>nd</sup>									
3 <sup>rd</sup>									

# Possible Risk Mitigation

## Ecological risk

- Lower application rates
- Extend intervals between applications
- Reduce the number of applications
- Use best management practices to reduce spray drift

## Possible Risk Mitigation

- ❑ Residential risk
  - Remove use on dogs
  - Remove homeowner use on fruit trees

## Phase 5

- ❑ Technical Briefing
- ❑ Revised risk assessment (incorporating all studies) available in public docket and on the internet
- ❑ Begin 60-day public participation period
- ❑ Public submits risk management ideas
- ❑ Opportunities for growers and others to meet with EPA



## Next Steps

- ❑ 60-day public comment period
- ❑ E-mail comments to:
  - [opp-docket@epa.gov](mailto:opp-docket@epa.gov)
- ❑ Mail comments to:
  - U.S. EPA  
OP Pesticide Docket (7502C)  
401 M St. SW  
Washington, DC 20460

## Contacts

### Phosmet

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